

The role of grief symptoms and a sense of injustice in the pathways to post-traumatic stress symptoms in post-conflict Timor-Leste

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Aims. Grief symptoms and a sense of injustice may be interrelated responses amongst persons exposed to mass conflict and both reactions may contribute to post-traumatic stress disorder (PTSD) symptoms. As yet, however, there is a dearth of data examining these relationships. Our study examined the contributions of grief and a sense of injustice to a model of PTSD symptoms that included the established determinants of trauma events, ongoing adversity and severe psychological distress. The study involved a large population sample ($n = 2964$, response rate: 82.4%) surveyed in post-conflict Timor-Leste.

Methods. The survey sites included an urban administrative area (suco) in Dili, the capital of Timor-Leste and a rural village located an hour's drive away. Culturally adapted measures were applied to assess conflict related traumatic events (TEs), ongoing adversity, persisting preoccupations with injustice, symptoms of grief, psychological distress (including depressive symptoms) and PTSD symptoms.

Results. We tested a series of structural equation models, the final comprehensive model, which included indices of grief symptoms and injustice, producing a good fit. Locating grief symptoms as the endpoint of the model produced a non-converging model. In the final model, strong associations were evident between grief and injustice ($\beta = 0.34$, s.e. = 0.02, $p < 0.01$) and grief and PTSD symptoms ($\beta = 0.14$, s.e. = 0.02, $p < 0.01$). The sense of injustice exerted a considerable effect on PTSD symptoms ($\beta = 0.13$, s.e. = 0.03, $p < 0.01$). In addition, multiple indirect paths were evident, most involving grief and a sense of injustice, attesting to the complex inter-relationship of these factors in contributing to PTSD symptoms.

Conclusions. Our findings support an expanded model of PTSD symptoms relevant to post-conflict populations, in which grief symptoms and a sense of injustice play pivotal roles. The model supports the importance of a focus on loss, grief and a sense of injustice in conducting trauma-focused psychotherapies for PTSD amongst populations exposed to mass conflict and violence. Further research is needed to identify the precise mechanisms whereby grief symptoms and the sense of injustice impact on PTSD symptoms.

Received 21 July 2015; Accepted 13 March 2016; First published online 30 August 2016

Key words: Bereavement, grief study, post-conflict and cross-cultural psychiatry, post traumatic stress disorder, violence.

Introduction

Research in the post-conflict mental health field supports a model of posttraumatic stress disorder (PTSD) symptoms, in which past exposure to traumatic events (TEs) and ongoing adversity both play contributory roles (Mollica *et al.* 2001; Steel *et al.* 2009).

The model does not take into account, however, the specific effects of traumatic losses (and associated grief symptoms) and the sense of injustice associated with exposure to human rights violations, distinctive characteristics of populations exposed to persecution (Boehnlein, 1987; Momartin *et al.* 2004; Silove, 2013). We test an expanded model of PTSD symptoms that includes grief symptoms and a sense of injustice in a population sample from post-conflict Timor-Leste.

Several authorities have argued that the existential impacts of trauma need to be more fully acknowledged in understanding the pathogenesis and persistence of the PTSD reaction (Rogler *et al.* 1994). However, only a few studies in the post-conflict field

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have inquired specifically into these issues, the focus commonly being on the sense of injustice arising from exposure to human rights violations (Basoglu *et al.* 2005; Rees *et al.* 2013). For example, a study in the Former Yugoslavia found that a sense of injustice was one of several factors associated with PTSD amongst survivors of the civil war in that region (Basoglu *et al.* 2005). In Timor-Leste (Rees *et al.* 2013; Silove *et al.* 2014), we found strong associations between a sense of injustice and symptoms of PTSD, psychological distress (including depressive symptoms) and explosive anger. Similar results were found in relation to PTSD in a study amongst refugees from neighbouring West Papua, a population exposed to prolonged persecution and displacement (Rees & Silove, 2011; Tay *et al.* 2015). As yet, however, little is known about the precise role that a sense of injustice plays within a comprehensive path model leading to PTSD symptoms.

Losses occurring in a setting of trauma may generate a persisting sense of injustice, which in turn may impact on PTSD symptoms (Horowitz, 1986; Janoff-Bulman, 1989; Herman, 1992; Mancini *et al.* 2011; Smith *et al.* 2015). In civilian settings, bereaved persons who continue to ruminate about the injustice of their loss are more likely to experience a prolonged or complicated grief response (Eisma *et al.* 2015). In addition to the sense of injustice, grief may be linked to PTSD symptoms in several ways. Exposure to atrocities confronts survivors with a direct threat to their personal safety in a context where they witness the violent death and injury of others, experiences that may trigger both a grief and PTSD reaction. In addition, core grief symptom, such as those involving preoccupations with, and yearning for the deceased, may act as triggers of PTSD symptoms. More general components of grief may exacerbate PTSD symptoms, for example, by increasing the tendency towards social withdrawal, isolation, avoidance and feelings of bitterness/anger.

The people of Timor-Leste experienced a prolonged period of conflict associated with extensive traumatic losses and human rights violations. After a brief civil war, Indonesia invaded the territory occupying it for 24 years (1975–1999), a period in which the indigenous population was exposed to extensive traumatic losses including widespread atrocities and extrajudicial killings (Modvig *et al.* 2000). Many Timorese died as an indirect consequence of the violence, for example, as a result of forced displacement, famine and illness. Following national independence (2002), a further period of internal conflict (2006–2007) resulted in deaths, injuries, burning of houses and internal displacement of communities (Silove *et al.* 2006). These historical conditions are likely to have generated widespread

reactions of grief and a sense of injustice within the survivor population.

Our overall objective in the present analysis was to examine the respective roles of grief symptoms and a sense of injustice in an expanded model of PTSD symptoms in a post-conflict society, Timor-Leste. We also examined the specificity of the pathways identified by testing two alternative models, in which indices of general psychological distress and grief were substituted for PTSD as the end points of the model.

Methods

Participants

The study was conducted between May, 2010 and November, 2011 and involved a household survey of all men and women, 18-years and older residing in two villages in Timor-Leste. The sites were an urban administrative area (*suco*) in Dili, the capital of Timor-Leste and a rural village located an hour's drive away. Each administrative unit is defined by contiguous hamlets (*aldeias*) under the administration of one chief (*chefe*). Both locations were directly affected by the longstanding resistance war against the Indonesian occupation and by the subsequent episode of internal conflict that occurred in 2006–2007. We used GPS coordinates and aerial maps to locate all dwellings in the two locations. Participants provided written or witnessed verbal consent. The study was approved by the Human Research Ethics Committee of the University of New South Wales, the Ministry of Health of Timor-Leste and the chiefs of each village.

Measures

Exposure to conflict-related TEs

We assessed the 17 conflict-related TEs listed in the Harvard Trauma Questionnaire (HTQ) (Mollica *et al.* 1992), modified to the context of Timor-Leste. TEs were assessed for the Indonesian occupation (1975–1999), and the subsequent period following national independence, which included the episode of internal conflict of 2006–2007. Items involved traumas directed at the self and others, including losses and separations. Typical items included political imprisonment, assault, torture, witnessing murder, exposure to atrocities, losses/separations of family or close others, and severe deprivation of medical care for self or others. We generated a composite trauma count (TC) by collapsing responses assessed for both historical periods; an item endorsed for one or both historical periods was assigned a score of 1 whereas a score of 0 indicated

no exposure to that event for either of the two historical periods.

Ongoing adversity

We applied an inventory of daily adversities based on community consultations and refinement of items via an iterative process of piloting and feedback (Rees *et al.* 2013). Items included, amongst others, insufficient food, inadequate finances (for school fees, to meet traditional obligations to family), poor shelter, unemployment and experiences of ongoing conflict (with spouse, children, extended family, young people and the wider community). The composite adversity count (AC) represented the addition of all endorsed items (1 = if an item was rated as a serious/very serious problem, 0 if rated as not serious/a less serious problem). The composite AC ranged from 0 to 27.

Sense of injustice

We asked respondents to identify and describe the worst acts of injustice they had experienced for the Indonesian occupation, the period of internal conflict and during contemporary times. By anchoring the inquiry to specific events, we aimed to avoid representing the concept of injustice in a purely abstract way. During piloting amongst Timorese drawing from a wide range of ages and backgrounds, we inquired into why participants nominated events as the worst form of injustice they had experienced. Participants offered reasons that were consistent with universal notions of injustice, referring to events as being grossly unfair, arbitrary and cruel which involved acts directed at the self or close others. They also characterized events as reflecting gross victimization or discrimination, usually involving abuses of power or intentional deprivations motivated by political reasons. In the study participants nominating an event were then asked whether the occurrence was a source of a persisting sense of injustice, and if so, whether their preoccupations caused them ongoing distress. Responses for each time period were scored as 0: no event nominated; 1: experienced an unjust event; 2: experienced an event and persisting preoccupations of injustice; and 3: experienced an event, persisting preoccupations of injustice and associated distress. In our modelling analysis, we included a composite latent index of injustice based on respondent scores (0–3) for each of the three historical periods.

Grief symptoms

We inquired whether participants had experienced a loss, defined as an event in which someone (family

member, relative, or friend) close to the individual had died in the last 6 months, in the last 5 years, during the period surrounding national independence (before and after 2002), during the Indonesian occupation (1975–1999), and prior to the Indonesian occupation (pre-1975).

Those identifying a loss were then asked to rate four grief items on a five-point scale (0 = almost never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always) experienced in the past 4 weeks. The initial item pool was based on symptoms most commonly described in the international literature amongst persons with prolonged grief (Maercker *et al.* 2013). Piloting amongst the Timorese yielded three consistently identified symptoms commonly experienced in relation to traumatic losses in the society, namely persistent yearning/longing for the deceased, intense bitterness and feelings of emptiness arising from the loss. A fourth item inquired into the degree of functional impairment associated with the grief symptoms endorsed. The items exhibited a high level of internal reliability ($\alpha = 0.87$) in the present sample. The index of grief represented an addition of endorsed items in the present analysis.

Post-traumatic stress disorder (PTSD) symptoms and psychological distress

PTSD symptoms were assessed using the relevant section of the HTQ (Mollica *et al.* 1992), comprising 16 items scored on a four-point scale (0 = none, 1 = some of the time, 2 = a lot of the time, 3 = most of the time). To assess psychological distress, we used the Kessler-10 scale, consisting of 10 items indexing depressive but also anxiety and somatic symptoms, each item scored on a five-point scale (1 = none, 2 = a little of the time, 3 = some of the time, 4 = most of the time, 5 = all of the time). Both the PTSD and psychological distress scales demonstrated high levels of internal reliability (HTQ PTSD, $\alpha = 0.95$; K-10, $\alpha = 0.92$). A previous study compared the HTQ and K10 with the relevant categories of PTSD and major depressive disorder of the Structured Clinical Interview for the Diagnostic and Statistical Manual IV applied in a blinded manner by experienced psychologists (Liddell *et al.* 2013). There was a sound level of convergence for both indices: Area Under the Curve (AUC) for PTSD 0.82 (95% CI: 0.71–0.94) and for the K10 0.79 (95% CI: 0.67–0.91). An HTQ score of 2.2 provided the best cut-off for PTSD: sensitivity 77.3%, specificity 87.5% and correct classification 83%. For the K-10, the international cut-off score of 30 or more provided the highest level of convergence: sensitivity 92.3%, specificity 66% and correct classification 71% (Silove *et al.* 2014). PTSD and psychological distress symptoms were applied as continuous variables in the analysis.

All measures were translated into Tetum, the most widely spoken language in Timor. Minor inconsistencies were addressed during piloting and the final versions were translated and back-translated using recommended international procedures (Van Ommeren *et al.* 1999).

Personnel training

Eighteen field personnel received 2-weeks training followed by 2 months of field testing and piloting of survey measures supervised by BL and NT. Pairs of interviewers were required to achieve a 100% inter-rater reliability on the symptom measures prior to the study. Interviewers were conducted in participants' homes and lasted an hour.

Statistical analysis

We generated descriptive data for socio-demographic variables, prevalence of TE exposure, items of ongoing adversity, mental health indices and the sense of injustice. All within household intra-class correlations for these indices were low (<0.05), allowing us to analyse all data according to individual participants.

We tested a series of structural equation models (SEM) of increasing complexity, the final model including indices of grief and injustice. In all models, continuous/count measures were used. First we tested the 'conventional' model in which paths led from TE exposure to PTSD symptoms, mediated by ongoing adversity. In the second model, we introduced the index of the sense of injustice located prior to PTSD symptoms. In the third model, we included both the index of grief symptoms and psychological distress at a point proximate to the endpoint of PTSD symptoms. We also investigated alternative pathways by substituting first grief symptoms and then psychological distress for PTSD as the end-point and re-examining the model fit indicators.

We applied Full Information Maximum Likelihood to estimate parameters of the path models based on continuous outcome variables. Criteria used to assess model fit (Hu & Bentler, 1999; Barrett, 2007) included a non-significant chi-square test; The Comparative Fit Index (CFI) (>0.90); the Tucker Lewis Index (TLI) (>0.90); the root mean square error of approximation (RMSEA) (<0.05), and the standardized root mean square ratio (SRMR) (<0.05). A large sample size increases the likelihood of producing a significant χ^2 . To test if sample size was a factor in generating a statistically significant chi-square test in our final, comprehensive model, we examined for differences in the parameter estimates of that model with the baseline model (Muthen & Muthen, 2014). A further test

involved an examination of the bias-corrected bootstrapped 95% confidence intervals in order to produce point estimates for indirect effects by randomly re-sampling (with replacement) 5000 pseudo-bootstrap samples (Preacher & Kelley, 2011; Hayes, 2013). The analysis was performed in Stata version 13 (StataCorp, 2013) and Mplus version 7 (Muthen & Muthen, 2014).

Results

Socio-demographic characteristics

From the pool of 3597 adults, 2964 completed interviews, a response rate of 82.4% (non-response was due to refusal [$n=81$], inability of our field staff to make contact in spite of three visits to the dwelling [$n=387$], and incapacity, mostly arising from severe intellectual impairment or physical disability [$n=165$]). The sample included 1451 men (49%) and 1513 women (51%) with an overall mean age of 36.4 years (s.d. = 14.43).

Table 1 indicates that two-thirds ($n=1844$, 62%) resided in the rural area and a similar proportion ($n=2013$, 67.9%) were married, the remainder being single/never married ($n=756$, 25.5%), widowed ($n=171$, 5.8%), divorced ($n=5$, 0.2%) or separated ($n=19$, 0.6%). Just over one in 10 ($n=343$, 11.6%) had completed primary education, 12.3% ($n=364$) junior school, 26.3% ($n=779$) senior high school and 10.7% ($n=317$) had received post-school education (college/university). A third ($n=1032$, 34%) were engaged in paid employment (in a range of work including government and private sectors), others being occupied with subsistence farming ($n=359$, 12.1%) or domestic duties ($n=315$, 10.6%). The remainder were retired ($n=180$, 6.1%), unable to work because of physical disability ($n=43$, 1.5%), or unemployed ($n=1035$, 34.9%).

Prevalence of grief symptoms, post-traumatic stress and psychological distress

A traumatic loss was reported by 2947 persons (99.4%), the analytic sample the grief symptom index. Of those, 13.8% ($n=408$) nominated a loss occurring prior to the Indonesian occupation (1975 or earlier, noting that there was a period of civil war leading up to the Indonesian invasion), 36.9% ($n=1094$) during the Indonesian occupation (1975–1999), 14% ($n=414$) during the period of national independence (circa 2002), 26.4% ($n=782$) in the previous 5 years including the period of internal conflict and 8.4% ($n=249$) in the 6 months prior to the study. The common causes of death were war-related, or a

Table 1. Socio-demographic characteristics of the sample ($n = 2964$)

	<i>n</i>	%
Sex		
Female	1451	49
Male	1513	51.1
Location		
Rural	1844	62
Urban	2013	67.9
Mean age, year (s.d.)	36.4	14.4
Age group (years)		
<24	578	19.5
25–34	1017	34.3
35–44	632	21.3
45–54	324	10.9
≥55	413	13.9
Marital status		
Married	2013	67.9
Single/never married	756	25.5
Widowed	171	5.8
Divorced	5	0.2
Separated	19	0.6
Educational attainment		
Completed primary	343	11.6
Completed secondary (junior)	364	12.3
Completed upper secondary (senior)	779	26.3
Completed tertiary	317	10.7
Employment		
Retired	180	6.1
Unable to work due to physical disability	43	1.5
Unemployed	1035	34.9
Employed (government/private sectors)	1032	34
Subsistence farming	359	12.1
Domestic duties	315	10.6

consequence of deprivation of emergency medical care or other forms of violence during the conflict.

Over two-thirds of those who nominated a loss endorsed at least one symptom of grief (that is, rated as some of the time or more frequently in the past 4 weeks), including persistent yearnings or longing for the deceased ($n = 2178$, 73.5%), feelings of bitterness about the death ($n = 1293$, 43.6%), and feelings of emptiness ($n = 1152$, 38.9%). In addition, a third ($n = 957$, 32.3%) reported functional impairment associated with grief symptoms.

In relation to other symptom measures, 15.3% ($n = 453$) met threshold for PTSD (>2.2) and 15.1% ($n = 447$) for severe psychological distress. There was a low but significant correlation between grief and PTSD symptoms (bivariate Pearson: 0.31, $p < 0.05$) and between grief and psychological distress ($p = 0.24$, $p < 0.05$), respectively.

Exposure to conflict-related TEs and ongoing adversity

Commonly reported TEs (Table 2) included extreme deprivation of food or water ($n = 2639$, 89%), no access to emergency medical care for family members ($n = 1914$, 64.6%) and self ($n = 1900$, 64.1%), home intentionally burnt down ($n = 2052$, 69.2%), involved in the resistance movement ($n = 1323$, 44.6%), witnessing assault ($n = 1130$, 38.1%), lack of shelter ($n = 738$, 24.9%), physical assault ($n = 773$, 26.1%), forced separation from family members ($n = 529$, 17.9%), witnessing murders of close others ($n = 481$, 16.2%) and of strangers ($n = 377$, 12.7%).

Ongoing adversities included exposure to mosquitoes ($n = 2307$, 77.8%), limited access to electricity ($n = 1983$, 66.9%), no access to clean water ($n = 1872$, 63.2%), conditions of drought ($n = 1718$, 58%), insufficient food ($n = 1617$, 54.6%), financial hardships ($n = 1586$, 53.5%), ongoing threats in current surroundings (51.5%, $n = 1527$), daily deprivations ($n = 1464$, 49.4%), lack of shelter ($n = 1372$, 46.3%), sickness ($n = 1251$, 42.2%), lack of external assistance by government or non-government agencies ($n = 1192$, 40.2%), lack of employment opportunities ($n = 1192$, 40.2%), problems/conflict in the community ($n = 579$, 19.5%) and conflict with spouse ($n = 446$, 15.1%) or family ($n = 397$, 13.4%).

Sense of injustice

The rates of persons with a sense of injustice (a score of 3) were 13.1% ($n = 388$) for the Indonesian occupation; 24.6% ($n = 729$) for the period including the internal conflict; and 18.5% ($n = 549$) for contemporary times. Bivariate tests showed statistical associations between the sense of injustice (for each of the three time periods) with all grief symptoms (results available on request).

Structural equation modelling

The base SEM (model 1) examining pathways from conflict-related TEs to PTSD symptoms, directly and via ongoing adversity yielded a poor fitting model ($\chi^2 [4] = 230.68$, $p < 0.000$, CFI = 0.86, TLI = 0.65, RMSEA = 0.08, SRMR = 0.04). In model 2, we included the sense of injustice as an intermediary step between conflict-related TEs and PTSD symptoms. The model produced a good fit 1 ($\chi^2 [6] = 10.95$, $p = 0.09$, CFI = 0.99, TLI = 0.99, RMSEA = 0.02, SRMR = 0.01), injustice accounting for 19% of the variance of PTSD symptoms.

In model 3, the comprehensive model, the index of grief symptoms was introduced proximate to the sense of injustice and psychological distress proximal

Table 2. Prevalence of exposure to conflict-related traumatic events (*n* = 2964).

Conflict-related traumatic events (TEs)*	N	%
Shortage of food or water	2638	89
No access to emergency medical care for family	1914	64.6
No access to emergency medical care for self	1900	64.1
House internationally burnt down	2052	69.2
Involved in resistance movement	1323	44.6
Witnessing someone seriously injured	1130	38.1
Shortage of shelter	738	24.9
Physical assault	773	26.1
Forced separation from family	529	17.9
Serious injury	602	20.3
Witnessing friend or family murdered	481	16.2
Torture	386	13
Disappearance of family members	826	27.9
Witnessing stranger murdered	377	12.7
Involved in combat	298	10.1
Imprisonment	167	5.6
Witnessing atrocities	114	3.9

*Respondents reported exposure to at least one TE across two historical epochs (1975–1999; 2004–2007).

to PTSD symptoms. With the exception of a significant χ^2 , other indicators suggested a good fitting model: χ^2 [10] = 19.79, *p* = 0.03, CFI = 0.99, TLI = 0.99, RMSEA = 0.02, SRMR = 0.01. Whether urban/rural residency was entered into the model made no difference to

the fit indicators. A sensitivity test indicated only a minimal difference in parameter estimates for the tested model as compared with a parsimonious one with a non-significant χ^2 suggesting that the significant χ^2 was most likely attributable to the large sample size. Figure 1 presents the final model diagrammatically. Table 3 reports goodness-of-fit statistics for the sequence of SEM models tested.

Reversing the positions of grief and PTSD symptoms by locating grief as the model end point produced a non-converging model. In addition, substituting severe psychological distress for PTSD as the endpoint yielded a model with a poor fit: (χ^2 [29] = 638.70, *p* < 0.000, CFI = 0.78, TLI = 0.66, RMSEA = 0.08, SRMR = 0.06).

Table 3 shows the variance explained for PTSD symptoms in the successive models tested. Model 3, which included grief and severe psychological distress, accounted for a considerable proportion of the variance of PTSD (0.31). Tables 4 and 5 report the standardized direct and indirect effects for the final model with bootstrapped 95% confidence intervals. TE exposure led directly to PTSD symptoms and indirectly to that outcome via ongoing adversity. Ongoing adversity was strongly associated with psychological distress. Finally, grief and psychological distress were strongly associated with each PTSD symptoms.

Several additional indirect pathways led to PTSD symptoms, the majority involving grief and the sense of injustice. These included: from conflict-related TEs

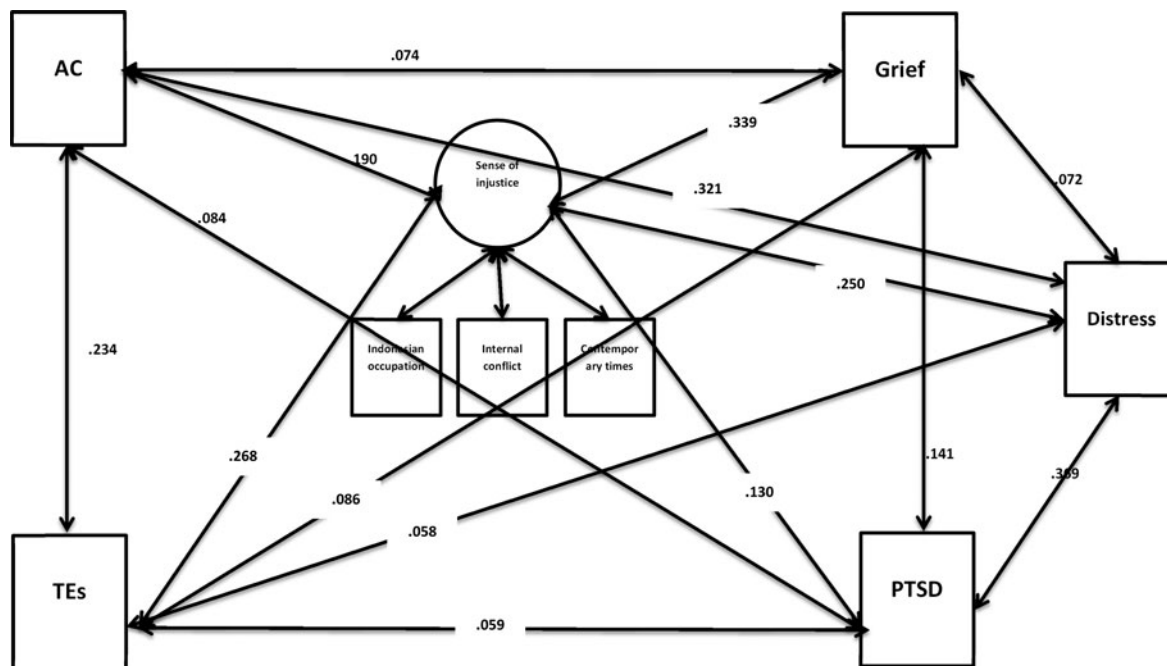


Fig. 1. A structural equation model examining pathways to PTSD symptoms (*n* = 2947). TEs, traumatic events; AC, adversity count; PTSD, post-traumatic stress disorder. All outcome variables were applied as continuous variables.

Table 3. Endorsement of ongoing adversities ($n = 2964$)

Ongoing adversities*	N	%
Mosquitoes	2307	77.8
Limited electricity	1983	66.9
No clean water	1872	63.2
Drought	1718	58
Insufficient food	1617	54.6
Financial difficulties	1586	53.5
Ongoing threats in current surroundings	1527	51.5
Limited access to public transport	1489	50.2
Daily deprivations (lack of fire)	1464	49.4
Lack of shelter	1372	46.3
Lack of financial support for traditional obligations	1333	45
Sickness	1251	42.2
No assistance from government	1192	40.2
Unemployment	1192	40.2
Worry about violence in the future	1125	38
High expectations from family members	1059	35.7
Work too hard	1045	35.3
Lack of financial support for education	1014	34.2
Problems controlling children	592	20
Problems in the community	579	19.5
Youth conflict	574	19.4
No access to medical care	462	15.6
Conflict with husband or wife	446	15.1
Conflict with family	397	13.4
Unable to work because of old age	297	10
A family member is 'gila' (crazy) because of exposure to past violence	102	3.4
Spouse/family members unable to work because of mental health problems	63	2.1
Spouse is 'gila' (crazy) because of exposure to past violence	48	1.6

*An adversity count (AC) generated based on a summation of endorsed items listed was used in the SEM analysis.

to the sense of injustice via adversity; from conflict-related TEs to symptoms of grief via adversity and injustice; from conflict-related TEs to severe psychological distress via adversity, the sense of injustice and grief; and from conflict-related TEs to PTSD via adversity, injustice, grief and severe psychological distress. Although all indirect pathways were significant, effect sizes were modest.

Table 4 shows that the sense of injustice was strongly associated with all mental health indices, particularly grief ($\beta = 0.34$, $s.e. = 0.02$, $p < 0.01$) but also severe psychological distress ($\beta = 0.25$, $s.e. = 0.03$, $p < 0.01$) and PTSD symptoms ($\beta = 0.13$, $s.e. = 0.03$, $p < 0.01$). Grief ($\beta = 0.14$, $s.e. = 0.02$, $p < 0.01$) and psychological distress ($\beta = 0.37$, $s.e. = 0.02$, $p < 0.01$) made substantial contributions to PTSD.

Discussion

Our findings support a theoretical model in which both grief symptoms and a sense of injustice contributed to pathways leading from conflict-related TEs to PTSD symptoms amongst a community sample of Timorese. Grief symptoms were strongly associated with a sense of injustice and both made major contributions to PTSD symptoms, directly and via a series of indirect paths.

Prior to considering our findings, we detail the strengths and limitations of the study. The survey involved a large sample and the response rate was high. Although we followed a systematic approach to adapting and translating our measures, we cannot discount the risk of transcultural errors in assessment. Although anamnestic bias can lead to inaccuracy in recording trauma and losses, we note that, in general, the events recorded are consistent with the known history of conflict in Timor-Leste. Importantly, however, the cross-sectional nature of our data can only indicate theoretical, not causal relationships. Our findings are restricted to two villages and may not be generalizable to the whole of Timor or to other populations. Longitudinal studies may assist in demonstrating the chronological sequencing of the relationships we investigated, particularly the relationship between symptoms of grief and PTSD.

Our index of grief includes the three core symptoms that were consistently identified amongst Timorese during piloting. We note, however, that our index does not include the full range of items proposed for the ICD-11 category of prolonged grief disorder (PGD) (Maercker *et al.* 2013). Assessing grief symptoms for 4 weeks is likely to have increased the accuracy of reporting but prevents us from inferring that the reaction was prolonged (Maercker *et al.* 2013). We recognize that the sense of injustice is a complex construct, which may be influenced by many variables, including personality factors that were not measured in our study.

Caveats notwithstanding, our study provides some support for an expanded model of PTSD symptoms in post-conflict societies, in which grief symptoms and a sense of injustice each play a central role. Past studies undertaken amongst other populations strongly suggest that grief symptoms are instrumental in the pathways leading to PTSD symptoms (Shear & Smith, 2002; Kaltman & Bonanno, 2003; Maercker & Znoj, 2010; Mancini *et al.* 2011; Nickerson *et al.* 2014; O'Connor *et al.* 2015). In addition, although past studies have shown associations between the sense of injustice and PTSD symptoms, our analysis helps to locate the former within a comprehensive path model (Pham *et al.* 2004; Basoglu *et al.* 2005; Mendeloff, 2009; Sonis *et al.* 2009).

Table 4. Sequential structural equation models examining pathways from conflict-related traumatic events to post-traumatic stress symptoms

Structural equation models tested		χ^2	<i>P</i>	df	CFI	TLI	RMSEA	SRMR
1	Conflict-related Traumatic Events (TEs), ongoing adversity and PTSD symptoms	230.68	<0.001	4	0.73	0.25	0.14	0.05
2	Conflict-related TEs, ongoing adversity, sense of injustice, PTSD symptoms	10.95	0.09	6	0.99	0.99	0.02	0.01
3	Conflict-related TEs, ongoing adversity, sense of injustice, grief, psychological distress and PTSD symptoms	19.79	0.03	10	0.99	0.99	0.02	0.01
		Sense of injustice						
Total variance explained in each model (r^2)*		AC	Indonesian occupation	Post-independence	Contemporary times	Grief	Psychological distress	PTSD
1	Conflict-related TEs, ongoing adversity, and PTSD symptoms	0.10	–	–	–	–	–	0.14
2	Conflict-related TEs, ongoing adversity, sense of injustice, PTSD symptoms	0.10	0.44	0.30	0.22	–	–	0.19
3	Conflict-related TEs, ongoing adversity, sense of injustice, grief, psychological distress, and PTSD symptoms	0.10	0.42	0.31	0.22	0.16	0.26	0.31

χ^2 , chi square; CFI, comparative fit index; TLI, Tucker Lewis index; RMSEA, root mean square error approximation; SRMR, standardized root mean square residual; PTSD, post-traumatic stress; AC, adversity count. All variables were applied as continuous variables in our modelling analysis.

* R^2 is calculated to show the proportion of variance explained in dependent variables included in each SEM model.

Table 5. Standardized effects of direct and indirect paths with bias-corrected bootstrapped 95% confidence interval

Direct and indirect estimates	β	S.E.
Measurement model		
Sense of injustice for		
Indonesian occupation	0.56	0.02
Post-independence period	0.65	0.02
Contemporary times	0.47	0.02
Structural model		
On ongoing adversity		
Conflict-related TEs	0.23	0.02
On sense of injustice		
Conflict-related TEs	0.27	0.02
Conflict-related TEs (via adversity)	0.05	0.01
Ongoing adversity	0.19	0.02
On grief symptoms		
Conflict-related TEs	0.09	0.02
Conflict-related TEs (via adversity)	0.02	0.01
Conflict-related TEs (via injustice)	0.09	0.01
Conflict-related TEs (via adversity, injustice)	0.02	0.002
Ongoing adversity	0.07	0.02
Sense of injustice	0.34	0.02
On psychological distress		
Conflict-related TEs	0.06	0.02
Conflict-related TEs (via grief)	0.01	0.002
Conflict-related TEs (via adversity)	0.08	0.01
Conflict-related TEs (via injustice)	0.07	0.01
Conflict-related TEs (via adversity, grief)	0.01	0.002
Conflict-related TEs (via injustice, grief)	0.01	0.002
Conflict-related TEs (via adversity, injustice)	0.01	0.002
Conflict-related TEs (via adversity, injustice, grief)	0.001	0.000
Ongoing adversity	0.32	0.02
Sense of injustice	0.25	0.03
Grief symptoms	0.07	0.02
On PTSD symptoms		
Conflict-related TEs	0.06	0.02
Conflict-related TEs (via psychological distress)	0.02	0.01
Conflict-related TEs (via grief)	0.01	0.003
Conflict-related TEs (via adversity)	0.02	0.004
Conflict-related TEs (via injustice)	0.04	0.01
Conflict-related TEs (via grief, psychological distress)	0.002	0.001
Conflict-related TEs (via adversity, psychological distress)	0.03	0.003
Conflict-related TEs (via injustice, psychological distress)	0.03	0.003
Conflict-related TEs (via adversity, grief)	0.002	0.001
Conflict-related TEs (via injustice, grief)	0.01	0.002
Conflict-related TEs (via adversity, injustice)	0.01	0.001
Conflict-related TEs (via adversity, grief, psychological distress)	0.00	0.00
Conflict-related TEs (via injustice, grief, psychological distress)	0.002	0.001

Continued

Table 5. Continued

Direct and indirect estimates	β	S.E.
Conflict-related TEs (via adversity, injustice, psychological distress)	0.004	0.001
Conflict-related TEs (via adversity, injustice, grief)	0.002	0.000
Conflict-related TEs (via adversity, injustice, grief, psychological distress)	0.00	0.00
Ongoing adversity	0.08	0.02
Sense of injustice	0.13	0.03
Grief symptoms	0.14	0.02
Psychological distress	0.37	0.02

All direct paths are significant at 0.01. Seventeen participants who did not report any losses were excluded from the analysis, yielding a reduced sample of 2947. Significance of indirect effects was tested using bootstrap method (5000 samples); bias-corrected bootstrapped confidence limits (95%) are reported. All indirect paths are significant at 0.01.

Our findings are readily interpretable within the historical context of Timor-Leste. Virtually all members of the Timorese community lost family members and close others during successive periods of conflict. Our previous studies showed that past human rights violations and contemporary grievances related to ongoing deprivations contributed to a persisting sense of injustice amongst the Timorese (Brooks *et al.* 2011; Rees *et al.* 2013). Qualitative data suggested that the failure to bring most perpetrators of murder and atrocities to account may have magnified feelings of injustice within the population (Silove *et al.* 2006). Study in South Africa indicated that witnessing murders and atrocities was a key form of trauma leading to PTSD and other psychiatric outcomes (Atwoli *et al.* 2015). In collective cultures such as South Africa and Timor-Leste, the violent death of others may be particularly potent in generating lasting feelings of injustice, adding to risk of PTSD.

Further research is needed to identify the precise mechanisms whereby grief symptoms impact on PTSD symptoms. One possibility is that symptoms of yearning and preoccupations with the deceased, core to the grief response, trigger and perpetuate the re-experiencing symptoms of PTSD, leading to an elaboration of the full reaction. At the same time, more general characteristics of severe grief such as withdrawal, feelings of isolation and a sense of bitterness could overlap with or exacerbate PTSD symptoms.

From a clinical perspective, our findings support the importance of focusing on both grief and the sense of injustice in treating PTSD in post-conflict populations.

Elements of these two components already form part of existing interventions, including cognitive behavioural therapy for grief (Murray et al. 2008), Interpersonal Therapy (Markowitz et al. 2009), Acceptance and Commitment Therapy (Hofmann et al. 2011) and Schema Therapy (Landes et al. 2013). Our findings highlight the relevance of focusing on traumatic losses, their meanings and particularly a sense of persisting injustice, when conducting trauma-focused therapies for survivors of mass conflict with PTSD.

Conclusions

Our findings provide a theoretical foundation for an expanded model of PTSD relevant to post-conflict populations in which grief symptoms and a sense of injustice play inter-related roles. The model reflects the intricate nature of the inter-relationships of all these key factors (trauma, grief, sense of injustice, psychological distress) leading to the PTSD reaction. Recognition of the key roles played by each of the contributors to the model supports a comprehensive approach in applying psychotherapies for survivors of mass conflict experiencing PTSD symptoms.

Acknowledgements

We thank all our field staff for their support.

Financial Support

This research was supported by the National Health and Medical Research Council (NHMRC) Australia. NHMRC program number: RM08300.

Conflict of Interest

None.

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